Math 1
Operations on Rational Expressions
Name: Key

Simplify the expression

1. $\frac{2x^2-4x}{x-2} = \frac{2x(x-2)}{x-2} = 2x$

excluded value: $x \neq 2$

2. $\frac{5x}{2}+\frac{1}{x} = \frac{x}{x}\cdot\frac{5x}{2}+\frac{1}{x}\cdot\frac{2}{2} = \frac{5x^2}{2x}+\frac{2}{2x}$

$= \frac{5x^2+2}{2x}$ excluded value $x \neq 0$

3. $\frac{x-3}{x+1}\div\frac{x^2-3x}{5x-5} = \frac{x-3}{x+1}\cdot\frac{5(x-1)}{x(x-3)}$

$= \frac{5(x-1)}{x(x+1)}$ excluded values $x \neq -1, 0, 3$

4. $\frac{4}{5x}-\frac{3}{x}\cdot\frac{5}{5} = \frac{4}{5x}-\frac{15}{5x} = \frac{-9}{5x}$

Excluded value: $x \neq 0$

5. $\frac{14}{3x}+\frac{x+5}{3x} = \frac{x+19}{3x}$

excluded value: $x \neq 0$

6. $\frac{x+3}{x^2+8x+15} = \frac{x+3}{(x+3)(x+5)} = \frac{1}{x+5}$

Excluded: $x \neq -3, -5$

7. $\frac{12x}{5}\div\frac{6x}{7} = \frac{12x}{5}\cdot\frac{7}{6x} = \frac{6x\cdot 2\cdot 7}{6x\cdot 5} = \frac{14}{5}$

8. $\frac{8}{2+3x}\cdot(8+12x) = \frac{8}{2+3x}\cdot\frac{4(2+3x)}{1}$

$= 32$

9. $\frac{5x}{x-3}-\frac{2x+1}{x-3} = \frac{5x-(2x+1)}{x-3}$

$= \frac{3x-1}{x-3}$

10. $\frac{2+3x}{5}\cdot\frac{15}{4+6x} = \frac{(2+3x)(5)(3)}{(5)(2)(2+3x)} = \frac{3}{2}$

11. $\frac{4}{x+2}+\frac{3}{x-2}$ $\frac{x-2}{x-2}\cdot\frac{4}{x+2}+\frac{3}{x-2}\cdot\frac{x+2}{x+2}$

$\frac{4x-8}{(x-2)(x+2)}+\frac{3x+6}{(x-2)(x+2)} = \frac{7x-2}{(x-2)(x+2)}$

12. $\frac{x^2+3x}{x^2+5x+6}+\frac{4}{x+2} \overset{*}{=} \frac{x(x+3)}{(x+3)(x+2)}+\frac{4}{x+2}\cdot\frac{x+3}{x+3}$

$\frac{x^2+3x+4x+12}{(x+3)(x+2)} = \frac{x^2+7x+12}{(x+3)(x+2)}$

$= \frac{(x+3)(x+4)}{(x+3)(x+2)} = \frac{x+4}{x+2}$

* or reduce $\frac{x(x+3)}{(x+3)(x+2)} = \frac{x}{x+2}$